CASE REPORT

Types of hyperodontic anomalies in permanent dentition: Report of 5 cases

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Abstract

Hyperodontia is a term used to express for the teeth more than the normal series in either dentition. Supernumerary teeth are developmental anomalies and are not uncommonly observed in permanent dentition of either jaw. Supernumerary teeth (multiple) have been reported with certain syndromes but multiple supernumeraries in non-syndromic individual have not been frequently reported. Several theories of this kind of developmental anomaly have been proposed but the precise etiology of non-syndromic supernumerary teeth is not clearly known. In patients with non-syndromic supernumerary teeth heredity factor has been proposed in several reports, therefore family history should be carefully explored.
This article provides series of case reports of all common types of supernumerary teeth seen in the permanent dentition, along with literature review, anatomy, etiology, incidences and treatment options suggested by various authors have been discussed.

Key words: Supernumerary, Mesiodens, Paramolar, Panoramic radiograph, Distomolar.

Introduction

Hyperodontia (supernumerary teeth) are found in addition to the normal series in either dentition, and may develop at any locations in either dental arch. Supernumerary teeth are detected during clinical examination or incidentally in the radiographs. The mean prevalence of supernumerary teeth [SNT] in clinical studies is about 1.2 %. However, some studies suggest no gender difference in regards to presence of SNT, but more number of authors have mentioned male predominance. Ectopic eruption of SNT may obstruct the path of unerupted permanent tooth. [1]; or cause spacing. A supernumerary tooth if located between maxillary central incisors is known as "Mesiodens" and is prevalent among the supernumeraries. Invariably an inverted asymptomatic mesiodens may be found in the radiograph, as further reported in a case here. Multiple supernumerary teeth are usually associated with certain syndrome; however, literature has evidently reported cases of non-syndromic solitary or multiple supernumerary teeth.
In patients of cleidocranial dysplasia SNT are found with frequency range of 22% in the maxillary incisor region to 5% in the molar region.
Supernumerary teeth have been reported in association with cleft lip and palate which results from fragmentation of the dental lamina during cleft formation. The frequency of 22.2% supernumerary permanent teeth in the cleft area in children with unilateral cleft lip or palate or both has been reported.
Literature also maintains contrary reports of occurrence of hypodontia in the patients patients of cleft lip and palate.
This article presents series of case reports of various types of non-syndromic patients with supernumerary teeth, commonly observed in permanent dentition.

Syndromes Associated Supernumerary Teeth

Presence of multiple supernumerary teeth is commonly associated with syndromes. One supernumerary tooth may represent an isolated occurrence, but it more commonly affects several family members. Familial hyperdontia is probably related to a common defective gene that has yet to be identified.

Multiple supernumerary teeth (even more than five teeth) are associated with medical conditions such as:

- Gardener's syndrome.
- Cleidocranial dysplasia.
- Hallermann-Streiff syndrome (less common).
- Oro-facio-digital syndrome (less common).

Classification of supernumerary teeth

According to the anatomical location of eruption or crown morphologic character of SNT, different nomenclature are stated as:

By the place of eruption, SNT are recognized as:

- **Mesiodens** – located between central incisors, most frequent among SNT. Occasionally inverted mesiodens can also be observed in routine radiographs.
- **Distomolar**-- a fourth molar develops distal to third molar.
- **Paramolar** – it may be fully developed or hypomorphic, small in size. Paramolars are found buccal or lingual to maxillary molars, preferably in relation to first molar. [2].
- **Additional premolar**—supplementary premolars in mandibular series, are the third most common supernumerary tooth. They are usually malposition (ectopic) eruption because of late eruption into the arch and lack of space.

According to morphologic character SNT can be designated as:

- **Conic--** most mesiodens are conical or peg shaped. Relative occurrence has been reported 75%, with location in anterior maxilla.
- **Tuberculated—**having more than one cusp. Relative occurrence is 12% with location in anterior maxilla. Barrel shaped crown with incomplete or no root.
- **Supplementary**—are duplication of a tooth in normal series. Relative occurrence has been found 7% with any location preferably in anterior maxilla near lateral incisors.
- **Odontoma--** would be fourth anatomic category of SNT with relatively 6% occurrence, located in anterior maxilla or posterior mandible. Small numerous teeth like structure or single irregular mass can be found in these sites.

The term "odontoma" refers to any tumor of odontogenic origin. Most authorities, however, accept the view that the odontoma represents a hamartomatous malformation rather than a neoplasm. The lesion is composed of more than one type of tissue and consequently has been called a composite odontoma. [3]. Two separate types of odontoma have been described: the diffuse mass of dental tissue which is totally disorganized is known as a complex composite odontoma, whereas the malformation which bears some superficial anatomical similarity to a normal tooth is referred to as a compound composite odontoma. [4].

Howard RD, [1967] has lists odontoma as the fourth category of supernumerary tooth. [3]. However, ubiquitously odontoma have not been accepted in the category of supernumerary teeth. [1].

Etiology of supernumerary tooth

Although, the etiology of SNT is not clearly understood, but it has been suggested that during the development of human teeth, numerous exogenous factors can interfere with odontogenesis. Proff et al. [5] have suggested that tooth anomalies result from complex interplay of genetic factors and developmental processes. One theory suggest that the antecessor tooth's enamel organ would duplicate, which means that a SNT could arise from remaining epithelium that becomes activated to tooth formation after breakdown of the tooth band.

Another theory, mentioned in the literature, suggests that the local and independent hyperactivity of dental lamina results in an excessive proliferation of cells, which results in the formation of extra tooth buds. [6, 7]. There is a focal over proliferation of developing dental lamina.

It has been advocated that there is a significant association between supernumerary teeth and invaginated teeth (teeth with an exaggerated cingulum pit).These findings may be explained by the fact that the embryological development of the premaxilla differs from that of the remaining maxilla. Therefore, there can be deviations in the premaxillary region that do not occur in the remaining maxilla. These deviations may lead to the formation of supernumerary teeth and other anomalies, including invaginated teeth.

The most supported theory suggests a polygenic mode of inheritance, with epistatic genes and environmental factors exerting some influence on the phenotypic expression of the genes involved. [8].

Several studies have shown that *MSX1* and *PAX9* play a role in early tooth development. *PAX9* is a paired domain transcription factor that plays a critical role in odontogenesis. The genetic theory of supernumerary tooth development is not clearly understood.

Problems associated with SNT

- Retention of normal dental elements.
- Problematic positioning of permanent tooth (ectopic eruption).
- Presence of associated dental cyst (dentigerous cyst).
- Impingement in buccal mucosa, pointing facially.

- Plaque and Food retention and initiating dental caries and inflammation of adjacent gingiva.
- Diastema.
- Occlusal problems.
- Cosmetic problems.
- Root resorption.
- Periodontal lesions due to compression of adjacent roots and pulp necrosis. [9].

When associated with above listed problems, it necessitates removal of SNT. In asymptomatic SNT regular radiographic monitoring is advised, to observe initiation of changes / development of pathosis [10].

Case reports

All the following reported cases here, were asymptomatic, and were detected during clinical examination or observed radiographs taken due to other purposes.
(dm= distomolar, s=supernumerary, pm=paramolar, supplementary premolar)

Case report—1.
A male aged 15 years, visited dental OPD for routine dental check up. Intraoral examination revealed additional erupting premolar, slightly submerged in the mandibular left region, with missing first molar (hypodontia). [radiograph 1A]. Intraoral radiograph of left mandibular premolar and right posterior quadrant molar were taken.
Following dentition was observed clinically and radiographs revealed in this patient.

8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1 1 2 3 4 5 7 8
dm sp

Left premolar region radiograph revealed missing first molar, and in place erupting additional premolar with open apex. In right quadrant radiograph small rudimentary distomolar was detected distal to third molar. [radiograph 1B].
Since the patient was asymptomatic therefore, no treatment was necessary for supernumerary teeth, and were kept under observation for couple of recall visits.

Case No—2
Female aged 15 years had generalized gingivitis. She had disuse heavy calculus deposited on right posteriors. History revealed that she was chewing on left side with no significant reason. Clinically no caries could be detected in any tooth, after periodontal phase—1 treatment, intra-oral radiographs of mandibular bilateral posteriors were taken. Following dentition was observed clinically and radiographs revealed SNT in association with first molar and first premolar as stated below.

8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8
s s

Radiograph of right posterior region disclosed a developing third premolar, against the mesial root of the first molar. [radiograph 2A]. Another radiograph was taken with distal shift technique to determine the side of the developing tooth, the developing premolar was found on lingual aspect. For detecting another such supernumerary tooth, radiograph of left mandibular molars was also taken. This radiograph disclosed one more developing premolar adjacent to apical third of first premolar. [radiograph 2B]. Full mouth apical radiographs were taken. Except these two developing additional premolars no other supernumerary could be observed. Patient had no symptoms related to SNT, therefore no treatment was necessary. Three and six months recall was satisfactory and patient was asymptomatic.

This patient was suggested a regulation observation but for commencing her higher studies she shifted to another town and recalls could not be maintained.

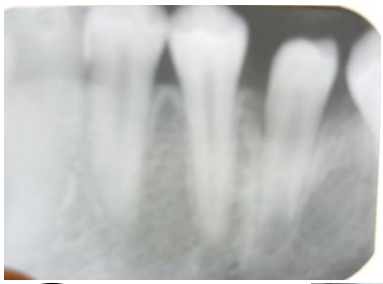
Case No—3
A 13 year old male, reported with a chief complaint of broken central incisors due to trauma which occurred 1 year ago. There was no other reported problem and all the dentition with respect to the age of patient was present.

s
7 6 5 4 3 2 1 1 2 3 4 5 6 7
7 6 5 4 3 2 1 1 2 3 4 5 6 7

Intra-oral radiograph was advised for broken central incisors. Radiograph revealed inverted un-erupted mesiodens located between the root apices of central incisors. This mesiodens apparently appeared oblige from middle of right root extending high up obliquely to incisive canal. Periapical rarefaction on both roots was suggestive of apical infection due to non-vital pulp suffered of trauma. Both the central incisors were treated endodontically and restored for rehabilitation. No treatment was indicated for the mesiodens since the patient was asymptomatic. It was decided to keep the patient for follow up to monitor the mesiodens for any complications, if it causes. The patient is on routine dental visit to the department for last 2 years and is asymptomatic till date.

Case report—4.
14years old female child reported with increasing space between maxillary central incisors noticed for 2 years. Intra-oral examination revealed that conical mesiodens erupted between central incisors. OPG radiograph was advised to explore additional tooth developed addition to the normal series.
The dentition had no other additional tooth.
Following dentition was found:

s
7654321 1234567
7654321 1234567



1A

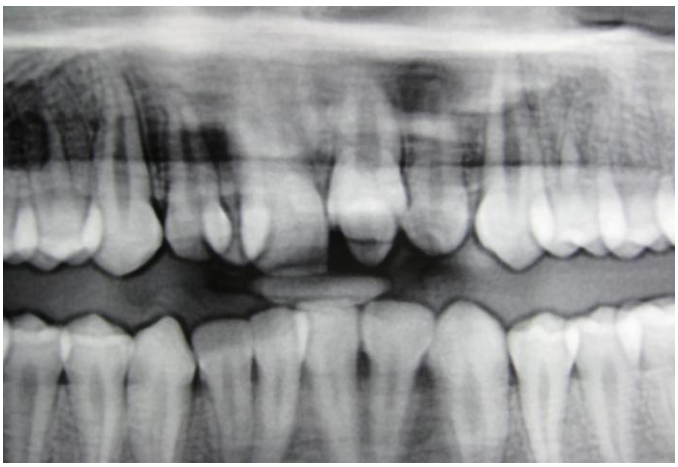
1B

Case No. 1. Radiograph 1A—showing missing mandibular first molar and additional premolar erupting in place. 1B—showing rudimentary disto-molar distal to mandibular right third molar.

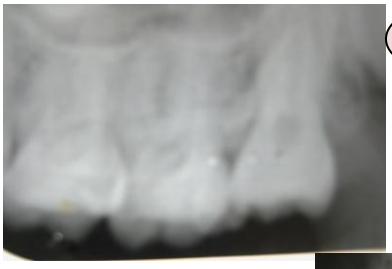
Case No.2. Radiograph 2A—showing developing additional premolar in relation to mesial root of mandibular right first molar.

Case No.2. Radiograph 2B-showing developing additional premolar in relation to root of mandibular right first premolar.

Case No.3. Radiograph showing inverted conical mesiodens between maxillary central incisors.



Case No.4 Fully erupted mesiodens in premaxillary region.



5A

5B

Case No.5. Radiographs 5A & 5B, bilateral showing superimposed paramolars in between maxillary second and third molars.

Mesiodens was the cause of diastema therefore patient was advised for extraction of mesiodens and further referral for orthodontic corrections.

Case No—5

A 16 year old female registered in dental office with complaint of bleeding gums for few months. Elsewhere, she visited dentist several times and was prescribed with tablets of metronidazole, and multi-vitamins, and topical applications of glycerin based formulations. She was carrying apical radiographs taken by her former dentist.
Clinical evaluation of the oral cavity showed gingival inflammation in lower anterior and bilateral maxillary posterior region with supragingival calculus on buccal surface of maxillary molars. Bilaterally between second and third maxillary molars rudimentary pointed, additional teeth were found, they were bilateral "paramolars", which is their usual location. Inra-oral
Following dentition was observed clinically and radiographs revealed SNT.

s s
8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8

On left side paramolar was located on the distal—buccal surface of second molar [radiograph 4 A] and right side paramolar erupted between second and third molar. OPG was advised to reveal unerupted SNT. Careful examination of OPG revealed over shadowing of small tooth like structures [paramolars] on the maxillary molars bilaterally. Because of the buccal pointing paramolars and calculus accumulation in the area extraction of these additional molars was decided.
Counseling of patient was done and written consent was obtained. Under infiltration anesthesia both side paramolars were extracted. Healing was uneventful, three months recall was satisfactory. Oral hygiene status improved in maxillary posteriors since extraction of both SNT facilitated better brushing.

Discussion

Panoramic radiograph (PR) is an important component in the diagnosis of dental, oral and cranio-facial disorders. Since the PR portraits the TMJ, maxillary sinuses along with complete maxilla and mandible, they are considered of great diagnostic value and treatment plan. Most abnormalities are better revealed in panorama, and hence preferred over periapical radiographs. Many orthodontists have recommended for PR as diagnostic aid for orthodontic procedures. [11].

The occurrence of non-syndromic SNT is more often in maxilla than in mandible [8:1], more often in male than in female [2:1], more often in permanent dentition than in primary dentition [1 % of the population compared with 0.5%], and more often unilaterally than bilaterally.A relationship between SNT and hereditary predisposition has also been suggested. Most cases are determined by multifactorial inheritance.
Batra et al. described a case of non-syndromic multiple supernumerary teeth, which suggests that there was an autosomal dominant pattern of inheritance [7]. Sedano and Gorlin have also suggested autosomal dominant trait [12].

Watanabe et al. found that among 5353 patients they examined, 24 had supernumerary teeth, and two thirds of these patients presented with only one supernumerary tooth. One patient had 7 supernumerary teeth but did not have any associated symptoms [13].

Brook examined 2000 school children and found that supernumerary teeth were present in 0.8 % of primary dentition and 2.1 % of permanent dentition [14]. Kinirons [1982] reported that there is no significant sex distribution of SNT in primary dentition while in the permanent teeth male approximately twice as frequent as females. [15].
Kalra et al. [16] described a clinical case, where the patient presented with 3 supernumerary teeth in mandibular premolar region and without any overlying medical condition. Batra, et al. [7] described a clinical case in which a 17 year old patient sought orthodontic treatment, primarily due to dental crowding. During the clinical examination the authors found retained deciduous teeth. Panoramic radiograph revealed the presence of 3 supernumerary teeth in maxilla and 8 in mandible, in addition to impacted maxillary canine, this patient had no medical complication.
Also these authors have suggested that there may be an autosomal dominant pattern of hereditary transmission for multiple supernumerary teeth. [7].
Yusof [1990], reported that the premolar region in lower arch is the most common place of supernumerary teeth. [17]. Contrary, the findings of other authors suggested that supernumerary in the mandibular premolar region are the third common among the additional teeth. Valmaseda-Castellon, et al [18] and Lopes et al. [19], observed that most frequent supernumerary teeth were mesiodens, fourth molar (disto/ para molar), and additional premolars.

Antonio Diaz et al. in their case report of a patient have mentioned 17 SNT and four supernumerary breasts of smaller size. This kind of anomaly of SNT and supernumerary breast has been first time reported. [20]. Smith [1969] has reported a case of 21 year old male having 19 SNT without evidence of systemic disease [21], and similarly Mody et al. reported a case of 19 year female with 16 SNT, non of which were present in the upper anterior region, which is the most common site of SNT. [22].
Treatment of problematic SNT has been suggested by several clinicians, which may be assumed necessary for the proper eruption, and alignment of dentition. According to Garvey, et al the need for orthodontic alignment of any dental element near a supernumerary

tooth justifies the surgical removal of the supernumerary tooth. [1]. Similarly SNT associated with cyst, causing trauma, caries, lodging plaque and food debris or indicative for orthodontic procedure necessitates to be removed. Removal of a supernumerary tooth preventing permanent tooth eruption usually results in the eruption of the tooth, provided adequate space is available in the arch to accommodate it. [23]. Di Biase found 75% of incisors erupted spontaneously after removal of the supernumerary. Eruption occurred on average within 18 months, provided that the incisor was not too far displaced and that sufficient space was available. Although the large numbers of clinicians have recommends exposure of the unerupted tooth when the supernumerary is removed, Di Biase advocates conservative management without exposure. [24]. SNT may fail to erupt or may erupt improperly.

Those impacted in the jaw have the propensity to develop dentigerous cysts. Other SNT have been reported to erupt into the gingiva, palate, tuberocity, nasal cavity, and orbital rim. Space limitation in the arch often forces the SNT to erupt buccally or lingually.

Ectopic SNT are unfunctional and may cause- plaque accumulation and gingival inflammation; food impaction; interference with tooth eruption; soft tissue injury; esthetic and masticatory problems. In general, SNT should be extracted to permit proper growth, development and occlusion. Significantly lower spontaneous eruption rate of 54% following supernumerary removal was reported by Witsenburg et al. who recommended the routine bonding of an attachment and gold chain for orthodontic traction at the time of surgery. [25]. However, the time and expense involved in this technique may not be justified if the rates of spontaneous incisor eruption are found to be in the region of 75 to 78%, as reported by both Mitchell and Bennett and Di Biase. [23-24].

Different types of supernumerary teeth commonly found in varied locations of permanent dentition have been reported here. Case No.3 & 4 are both variety of mesiodens conical fully erupted causing diasthema and inverted embedded asymptomatic. The case No.5 with maxillary paramolars had hereditary factor applicable since her mother also had similar paramolars in relation to bilateral maxillary first molars, those were removed by this author before 18 years; therefore relationship of heredity as suggested by Batra et al. and others, is also be agreed here.

Conclusion

A division of developing tooth bud forms supernumerary teeth. These teeth if found multiple, are usually associated with medical condition as stated above. Non-syndromic supernumerary teeth are rare anomaly. Generally non-syndromic, asymptomatic supernumerary teeth are disclosed incidentally in radiographic examination advised for other procedures. It is difficult to establish an ideal treatment for cases of multiple supernumerary teeth. Clinical and radiographic examination is of vital importance to carryout a multi-disciplinary dental treatment plan, if necessary.

Non-syndromic supernumerary teeth if asymptomatic need to have periodical radiographic observation, and on being found with any variation, should be advisable for removal.

The site specific case reports discussed here are all possible variety of SNT which are generally found in permanent series. These SNT were detected during clinical examination or in radiographs advised for other purposes. Radiographs disclosed the SNT, like supplementary erupted and developing premolars, distomolar in the right mandibular region, bilateral maxillary paramolars, inverted un-erupted and fully erupted mesiodens. Since all cases reported here were asymptomatic therefore no treatment of SNT was proposed other then periodontal phase-1 therapy. It is advisable to obtain detailed family history in patients with SNT to disclose hyperodontia in members of the family.

References:

1. Garvey MT, Barry HJ, Blake M. Supernumerary teeth—an over view of classification, diagnosis, and management. J Can Dent Assoc 1999; 65:612--16.
2. Tommasi AF. Diagnostico em Patologia Bucal. Sao Paulo, Brazil: Artes Medicas; 1988:85-97.
3. Howard RD. The unerupted incisor. A study of the postoperative eruptive history of incisors delayed in their eruption by supernumerary teeth. *Dent Pract Dent Rec* 1967; 17:332-41.
4. Shafer WG, Hine MK, Levy BM. A Textbook of Oral Pathology. 4th ed. Philadelphia: W.B. Saunders;1983.p.308-11.
5. Proff P, Fanghanel J, Allegrini S Jr, et al. problems of supernumerary teeth, hyperdontia or dentes supernumerarii. Ann Anat 2006; 188:163-69.
6. Liu JF. Characteristic of premaxillary supernumerary teeth: a survey of 112 cases. ASDC J Dent Child. 1995;62: 262-65.
7. Batra P, Duggal R, Prakash H. Non-syndromic multiplesupernumerary teeth transmitted as autosomal dominant trait. JOralPathol Med. 2005; 34: 621-25.
8. Thesleff I. Genetic basis of tooth development and dental defects.Acta Ododntogenica Scandinavica. 2000; 58:191—94.
9. Davis PJ. Hypodontia and hyperodontia of permanent teeth in HongKong school children. Community Dentistry and Oral Epidemiology 1987; 15: 218—20.
10. Hurlen B, Humerfelt D. Characteristics of premaxillary hyperodontia.A radiographic study. Acta Odontol Scand 1985; 43:75-81.
11. Bondemark L, Jeppsson M, Lindh-Ingildsen L, et al. Incidental findings of pathology and abnormality in pretreatment orthodontic

panoramic radiographs. Angle Orthod. 2006;76: 98-102.
12. Sedano HO, Gorlin R. Familial occurrence of mesiodens. Oral SurgOral Med Oral Pathol 1969;27:360—2.
13. Watanabe PCA, Souza JG, Almeida SM, et al. Estudo radiografico(orthopantomografico) da incidencia das anomalies dentais de numeronaregiao de piracicaba SP. ROBRAC 1997 ; 6 :32-37.
14. Brook AH. Dental anomalies of numerous form and size : Their prevalence in british school children. J Int Assoc Dent Child1974;5:37—53.
15. Kinirons MJ. Unerupted premaxillary supernumerary teeth. A study of their occurrence in male and females. Br. Dent J 1982; 153:110
16. Kalra N, Chaudhary S, Sanghi S. Non-syndrome multiple Supplemental supernumerary teeth. J Indian Soc Pedod Prev Dent 2005; 23: 46-48.
17. Yusof WZ. Non-syndromic multiple supernumerary teeth. J Can Dent Assoc 1990; 56:147—9.
18. Valmaseda_castellon E, Berini-Aytes L, Gay- Escoda C. Supernumerary premolars: report of ten cases. Bull Group Int Rech Sci Stomatol Odontol. 2001;43:19-25.
19. Lopes SMP, Elias RA, Lopes MA, et al. Achados radiografico em1000 pacientes trados para atendimento odontologico. Revista Brasileira de odontologia. 2004 ; 61 :172-75.
20. Antonio Diaz, Jose Orozco, Maria Fonseca. Multiple hyperodontia :Report of a case with 17 supernumerary teeth with non-syndromicassociation. Med Oral Patol Oral Cir Bucal 2009 May 1, 34(5).e.229—31.
21. Smith JD. Hyperdontia: report of a case. J Am Dent Assoc1969; 79 : 1191—2.
22. Mody RN, Kekre MM. Multiple supernumerary teeth – a short case report. J Pierre Fauchard Acad 1987; 1: 69—70.
23. Mitchell L, Bennett TG. Supernumerary teeth causing delayed eruption — a retrospective study. Br J Orthod 1992; 19:41-6.
24. Di Biase DD. The effects of variations in tooth morphology and position on eruption. Dent Pract Dent Rec 1971; 22:95-108.
25. Witsenburg B, Boering G. Eruption of impacted permanent upper incisors after removal of supernumerary teeth. Int J Oral Surg 1981; 110:423-31